

IN THE CLAIMS

Please amend the claims as follows:

1-6. canceled

7. (currently amended) A method for performing lock management for a flash copy in a shared storage system, said method comprising:

designating one node within said shared storage system an owner node for metadata relating to all input/output (I/O) relationships of a region of storage;

designating remaining nodes within said shared storage system client nodes;

in response to a host I/O request arriving at one of said client nodes, suspending said I/O request by said one client node and inquiring said owner node if said region of storage associated with said I/O request has been copied;

placing a lock record by said owner node against an appropriate metadata for said region of storage associated with said I/O request if said region of storage associated with said I/O request has not been copied storing a copy of metadata specifying a coherency relationship between a region of data and a flash copy image of said region of data within a cache, wherein said metadata is subject to one or more lock protocols controlled by an owner storage controller node;

if said I/O request is a Target Read, transferring data to a host by said one client node via a Flash Copy algorithm, and sending an UNL message to said owner node by said one client node at the completion of said data transfer receiving a request to perform an input/output operation on at least one of said region of data and said flash copy image of said region of data at a client storage controller node; and

removing said lock record by said owner node from its metadata table upon the receipt of said UNL message performing said input/output operation utilizing an input/output performing component of said client storage controller node and said copy of said metadata.

8. (currently amended) The method of claim 7, wherein said method further includes comprising:

if said I/O request is a Target Write or Source Write, performing a copy-on-write by said one client node, and sending an UNLC request to said owner node by said one client node at the completion of said copy-on-write; and

upon the receipt of said UNLC request,

marking by said owner node in its metadata a region affected;

removing said lock record;

informing any waiting requests that said region has been copied and issuing an UNLD message to said one client node;

upon the receipt of said UNLD message, releasing said suspended write operation by said one client node and completing said write operation to said host transferring at least one of: a message to request a lock, a message to grant a lock, a message to request release of a lock, and a message to signal that a lock has been released between said client storage controller node and said owner storage controller node utilizing a messaging component.

9-12. canceled.

13. (currently amended) A computer storage machine readable medium having a computer program product for performing lock management for a flash copy in a shared storage system, plurality of instructions executable by a machine embodied therein, wherein said plurality of ~~instructions, when executed, cause said machine to perform a method~~ said computer storage medium comprising:

computer program code for designating one node within said shared storage system an owner node for metadata relating to all input/output (I/O) relationships of a region of storage;

computer program code for designating remaining nodes within said shared storage system client nodes;

computer program code for, in response to a host I/O request arriving at one of said client nodes, suspending said I/O request by said one client node and inquiring said owner node if said region of storage associated with said I/O request has been copied;

computer program code for placing a lock record by said owner node against an appropriate metadata for said region of storage associated with said I/O request if said region of storage associated with said I/O request has not been copied storing a copy of metadata specifying a coherency relationship between a region of data and a flash copy image of said region of data within a cache, wherein said metadata is subject to one or more lock protocols controlled by an owner storage controller node;

computer program code for, if said I/O request is a Target Read, transferring data to a host by said one client node via a Flash Copy algorithm, and sending an UNL message to said owner node by said one client node at the completion of said data transfer receiving a request to perform an input/output operation on at least one of said region of data and said flash copy image of said region of data at a client storage controller node; and

computer program code for removing said lock record by said owner node from its metadata table upon the receipt of said UNL message performing said input/output operation utilizing an input/output performing component of said client storage controller node and said copy of said metadata.

14. (currently amended) The computer storage machine-readable medium of claim 13, said method further comprising:

computer program code for, if said I/O request is a Target Write or Source Write, performing a copy-on-write by said one client node, and sending an UNLC request to said owner node by said one client node at the completion of said copy-on-write; and

upon the receipt of said UNLC request,

computer program code for marking by said owner node in its metadata a region affected;

computer program code for removing said lock record;

computer program code for informing any waiting requests that said region has been copied and issuing an UNLD message to said one client node;

upon the receipt of said UNLD message, computer program code for releasing said suspended write operation by said one client node and completing said write operation to said host transferring at least one of: a message to request a lock, a message to grant a lock, a message to request release of a lock, and a message to signal that a lock has been released between said client storage controller node and said owner storage controller node utilizing a messaging component.

15-18. canceled